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TORNADOES IN VIRGINIA, 1814-1925

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The compilation of a record of tornadoes and the construction of a tornado map is a difficult and unsatisfactory task. Not only are the necessary data widely scattered, but when assemblage from all available sources has been completed many interesting and often essential details are lacking. The phenomena involved are exceedingly transient, and the destructive results are quickly healed by man and nature. Therefore, unless the affected area is soon visited by a competent observer, much of the interesting detail and many of the unusual features are permanently lost, or survive only in the memory of the local inhabitants, always an uncertain index of what occurred.

Another difficulty is in interpreting correctly the character and motions of the destructive winds. Thunderstorm squalls may do considerable local damage leading to the belief that they were tornadic, yet they lack the gyratory motion of tornadic winds and can not be classed as such. Trained observers can readily detect the difference from the position and attitude of the debris, but unless a storm causes great property damage or casualties the area is rarely visited by such observers. In the following account an earnest effort has been made to exclude all storms that did not exhibit the phenomena characteristic of tornadoes.

The record for the earlier years is necessarily meager and brief due to uncertain and difficult means of communication, smaller population, and absence of a suitable

agency for the collection and recording of weather data. The record is believed to be fairly complete since 1870, although probably a number of mild tornadoes in country districts have not been recorded.

In the preparation of the data all available sources have been utilized. Files of old newspapers have been consulted and clues have been profitably followed up by personal correspondence. The records of the Weather Bureau office in Richmond have been placed at the writer's disposal by Mr. E. A. Evans, in charge of that office. A number of accounts have appeared in the MONTHLY WEATHER REVIEW, and Mr. H. C. Hunter, of the Weather Bureau, has kindly assisted in making available from the files in Washington the record of a number of occurrences. The reports by Mr. J. P. Finley published in 1882 and 1885 by the United States Signal Service have supplied information concerning a number of Virginia tornadoes, and Mr. Finley has kindly supplemented this with details regarding 22 more recent occurrences. The annual reports of the Chief of the Weather Bureau, particularly for the years 1896 and 1897, have also yielded valuable data.

Table 1 gives all obtainable data for the 63 tornadoes recorded in Virginia to January 1, 1925. The order is chronological. The numbers in the first column are those of the tornado tracks the location and relative length of which are shown in Figure 1.

TABLE 1.—Tornadoes reported in Virginia; earliest record (1814) to close of 1925

No.	Date	County	Place	Time	Direction of movement	Length of path	Width of path	Tornado cloud	Number of persons		Property loss and remarks
									Killed	Injured	
1	Aug. 25, 1814	Loudoun	Leesburg ¹	3:30 p. m.	NE	Miles 6	Feet 600	Funnel		2	
2	July 27, 1816	Henrico	Manchester ¹	4 p. m.	NE	14	1,000	do.	2	3	Damage to buildings (\$3,000). Dark cloud; rumbling noise.
3	May 16, 1834	Isle of Wight	Smithfield ¹	5 p. m.	E. 10° S.	12	800	do.	3	4	Five buildings destroyed, timber, crops. Two clouds met in west and southwest.
4	June 21, 1834	James City	Lightfoot ¹	3 p. m.	E.	10	1,200	Cone	1	3	Heavy damage to crops. Damage to buildings (\$5,000). Loud roaring noise.
5	Mar. 4, 1842	Cumberland	Cartersville ¹	6 p. m.	NE	8	1,500	Funnel		3	Two clouds met in the West.
6	Mar. 19, 1857	Isle of Wight	Carrollton ¹	4:30 p. m.	ENE		500	Cone		2	Heavy damage to crops.
7	June 25, 1874	Smyth	Marion								
8	Aug. 23, 1875	Norfolk	Norfolk ¹								Hail before tornado.
9	July 13, 1876	do.	do.								
10	do.	Nottoway	Nottoway	P. m.	NE	35					Rain and hail before tornado. Very dark clouds in Southwest and Northwest.
11	May 8, 1878	Bedford	Bunker Hill	P. m.	NE	8					Heavy damage to timber; fallen trees blocking roads.
12	Sept. 12, 1878	Dinwiddie		P. m.	NE		40-300	Funnel			Rain before, hail after tornado.
13	do.	Hanover		P. m.	NE	15	375				Severe damage to crops and timber.
14	do.	Dinwiddie	Ford's Station	1:20 p. m.	SE	45	40-300	Funnel			Hail before tornado.
15	do.	Goochland	Dover Mines ¹	4 p. m.	SE	28	300-700	do.			Heavy damage to timber and crops; several buildings destroyed. Rain and hail before tornado roaring noise. Terrible roaring noise. Light objects carried several miles.
16	Apr. 3, 1879	Halifax	Denniston ¹	3 p. m.	NE	5	1,000	do.		3	Severe damage to crops.
17	June 25, 1881	Rockingham	Port Republic	P. m.	NE	6	3,000-6,000				Severe damage to crops.
18	Aug. 13, 1881	Dinwiddie	Petersburg	5 p. m.	NE	15	1/2 mile.	Cone			Heavy damage to crops. Houses unroofed, buildings damaged. Hail.
19	May 11, 1882	Southeast part of State.									Severe damage to crops. Several residences and barns destroyed.
20	June 4, 1882	Southampton			S. or SW				2 in N. Ca.		Severe damage to crops. Several buildings damaged.
21	Aug. 21, 1884	Chesterfield	Nash ¹	6 p. m.	ENE	12	1,000	Funnel			Much destruction to trees and buildings by hail.
22	Apr. 3, 1884	Campbell	Evington	8 p. m.	ENE	8	1,800	Basket		2	Heavy damage to crops. Several buildings unroofed. Heavy electrical storm.
23	July 18, 1886	Lunenburg	Northern part	P. m.	NE		90	Funnel			Severe damage to timber. Several buildings damaged.
24	July 23, 1886	Accomac	Craddockville ¹	5 p. m.	NE	6	800	do.	1	3	Severe damage to crops. Several buildings destroyed. Rumbling noise like railroad train.
25	Sept. 12-13, 1886	do.	Onancock	12-1 a. m.	NE	5	100-250	do.			Severe damage to timber and crops. Several houses destroyed, many unroofed. Loud roaring noise.
26	Apr. 18, 1887	Nansemond	Myrtle	6:30 p. m.	NE	6	300-600	do.	2	5	Severe damage to crops. Many houses, barns, etc., damaged. Total damage, \$10,000.
27	June 21, 1887	Nottoway-Amelia			NE						Orchards and barns damaged.
28	July 23, 1887	Wythe	Wytheville	8:45 p. m.				Funnel			Cloud did not touch earth.
29	Aug. 12, 1887	Rockbridge	Lexington	4 p. m.	NE	10	800	do.			Heavy damage to crops; several buildings unroofed. Damage, \$5,000.
30	May 31, 1888	Nansemond	Buckhorn ¹	4 p. m.	NE	15	900-1,320	do.		3	
31	July 8, 1888	Fauquier	Hume ¹	9:30 p. m.	Easterly		2,640	do.	2	4	Heavy damage to crops. Two clouds met in the west.
32	Aug. 12, 1888	Rockingham	Cherry Grove ¹	Evening	Easterly	10	1,320	Cone		2	Crops, houses, and barns destroyed.
33	Sept. 10, 1888	Southampton	Seabrell ¹	4 p. m.	E		1,320	Funnel		2	Outbuildings destroyed.
34	do.	Nansemond	Elwood ¹	4:30 p. m.	ENE		800	do.	1	3	
35	do.	Isle of Wight	Windsor ¹	5 p. m.	NE	5	300-600	do.		4	Much damage to crops, and much damage to buildings.
36	Sept. 20, 1888	Orange	Unionville ¹	4 p. m.	NE	7	400-600	do.	1	3	Very destructive, many buildings damaged.
37	May 11, 1889	Cumberland	Northern part	4 p. m.	NE	10	1,100		2	1	Small damage.
38	May 14, 1889	Pittsylvania	Danville	3:30 p. m.	ENE	13	1,300	Basket			Heavy damage to crops. Damage to buildings about \$3,000.
39	May 29, 1890	Fauquier	Rectortown	3 p. m.	SE	12	900-1,200				Severe damage to timber and crops; several buildings damaged.
40	May 20, 1896	Mecklenburg	South Hill	5:30 p. m.	N		50				Damage, \$2,000.
41	July 8, 1896	Sussex and Prince George		5 p. m.	N	20	150-450			5	Damage, \$1,200.
42	Aug. 18, 1904	Albemarle	Owensville	P. m.	Easterly	10	2,500	Funnel		1	Severe damage to buildings, crops, and timber.
43	Feb. 21, 1912	Fluvanna	Bremo Bluff	8:30 p. m.	SW, curving to NW.						Barns and stables unroofed; timber blown down.
44	May 12, 1912	Henrico	Richmond	12:30 p. m.	NE						Timber blown down; houses and barns unroofed.
45	do.	Campbell	Brookneal	4:30 p. m.	NE						Timber blown down; buildings demolished.
46	Aug. 21, 1912	Northumberland	Avalon	3:30 p. m.	SE					2	Severe damage to timber, crops, and buildings.
47	May 12, 1913	Buckingham	Penlan		NE						Slight damage to timber.
48	Aug. 3, 1915	Dinwiddie	Petersburg	2:30 p. m.	N. and NE	40		Funnel			Damage to timber, crops and several buildings. Estimated damage, \$10,000 or more.
49	do.	Caroline	Milford		NW	2	600	do.			Damage to timber and several buildings.
50	Oct. 29, 1917	Sussex	Jarratt	4 a. m.	SE	8	900				Heavy damage to crops, and severe damage to buildings. Estimated damage, \$10,000.
51	do.	Pittsylvania	Motley	10:30 p. m.	SE	2					Damage to timber, crops, and buildings.
52	do.	do.	Gretna ¹	10:40 p. m.	NNE	2	150-600		1	3	Heavy damage to buildings, estimated \$50,000. Most destructive Virginia tornado.

¹ Near.² About.³ Giles, Albert W.: A Virginia Tornado. MONTHLY WEATHER REVIEW, October, 1918, pp. 460-464.

TABLE 1.—Tornadoes reported in Virginia; earliest record (1814) to close of 1925—Continued

No.	Date	County	Place	Time	Direction of movement	Length of path	Width of path	Tornado cloud	Number of persons		Property loss and remarks
									Killed	Injured	
53	Apr. 30, 1918	Pittsylvania.....	Bachelors Hall.....	4 p. m.	E.....	Miles	Feet 1 300	.....	.....	.....	Damage estimated at \$1,600. Storm short-lived, moderate energy.
54	July 5, 1921	Albemarle.....	Cobham.....	2 p. m.	NE.....	2	1,500	.....	.....	.....	Only slight damage.
55	Sept. 12, 1921	Augusta.....	Mint Spring.....	.....	NE.....	5	1 300	.....	0	2	Several large trees uprooted. One house demolished, another damaged. Total damage, \$5,000.
56	Aug. 7, 1922	Albemarle ¹	Ivy.....	3 p. m.	SE.....	10	2,500	Funnel.....	.....	.....	Timber, crops, and several buildings damaged. Estimated damage, \$5,000.
57	Apr. 30, 1924	Amelia.....	Maplewood ²	5:30 p. m.	NE.....	10	300-900	do.....	1	12	Severe damage to crops. Forty buildings damaged or destroyed. Estimated loss, \$20,000.
58	do.....	Greensville.....	Pleasant Shade ²	5 p. m.	NE.....	1/2	125	do.....	.....	.....	One building destroyed; damage, \$1,000.
59	July 2, 1925	Shenandoah.....	Mount Jackson.....	P. m.	.....	.....	.....	.....	.....	.....	Tornado short-lived; slight energy. Severe damage to orchards and crops by hail and wind. Tornado potential strongly developed. Estimated damage, \$150,000.
60	July 4, 1925	Pittsylvania.....	Mount Hermon.....	P. m.	NE.....	2	.....	Funnel.....	.....	.....	Severe damage to crops; several buildings damaged. Two funnel clouds converged.
61	July 26, 1925	Nansemond.....	Holland ¹	4 p. m.	ENE.....	16	900	do.....	.....	5	Heavy damage to crops; several buildings destroyed.
62	do.....	Spotsylvania.....	Fredericksburg ¹	P. m.	NE.....	1/2	250	do.....	.....	.....	Small damage to buildings on one farm. Funnel cloud dipped down and swept across one farm.
63	Sept. 16, 1925	Pittsylvania.....	Whittles.....	P. m.	NE (?).....	2	.....	do.....	.....	.....	Church destroyed; dozen buildings damaged; small damage to crops. damage estimated, \$6,000.

¹ Near.² About.¹ Giles, Albert W.: The Charlottesville, Virginia, Tornado of Aug. 7, 1922. MONTHLY WEATHER REVIEW, August, 1922, pp. 426-427.² Hunter, H. C.: Tornadoes from Arkansas to Virginia, Apr. 29-30, 1924. MONTHLY WEATHER REVIEW, April, 1924, pp. 206-207.

The record previous to 1870 includes only six tornadoes, with none reported for the decades 1820-1830 and 1860-1870. Since 1870, 57 have been reported. The apparent increase is not due to greater frequency of tornadoes, but to increase in population, in facilities for obtaining reports, and a more intelligent popular interest in the weather. Table 2 shows the annual number of tornadoes from 1814 to the close of 1925, the years without them being omitted.

TABLE 2.—Total number of tornadoes reported each year in Virginia, 1814-1925

Year	Number	Year	Number
1814.....	1	1859.....	2
1816.....	1	1890.....	1
1834.....	2	1896.....	2
1842.....	1	1904.....	1
1857.....	1	1912.....	4
1874.....	1	1913.....	1
1875.....	1	1915.....	2
1876.....	2	1917.....	3
1878.....	5	1918.....	1
1879.....	1	1921.....	2
1881.....	2	1922.....	1
1882.....	2	1924.....	2
1884.....	2	1925.....	5
1886.....	3		
1887.....	4		
1888.....	7	Total (29 years).....	63

The average yearly frequency, 1814-1925, was only 0.56. From 1870 to the close of 1925, a period when reports may be considered to be reasonably complete, the annual frequency was 1.02. And for the period 1916-1925 it was 1.4.

Virginia is not a leader among tornado States, but experiences enough of these storms to warrant the keeping of accurate tornado records. Table 3 compares tornado frequency in Virginia with that in several other States having roughly similar areas.

TABLE 3.—Tornado frequency in Virginia and in a number of other States. (After Finley¹)

State	Area	Number of recorded tornadoes
	Square miles	
Virginia.....	42,627	63
New York.....	49,204	144
Pennsylvania.....	45,126	145
West Virginia.....	24,170	19
Ohio.....	41,040	210
Indiana.....	36,354	154
Tennessee.....	42,022	99
Kentucky.....	40,598	84
North Carolina.....	52,426	108
South Carolina.....	30,989	120
Georgia.....	59,265	190
Florida.....	58,666	27
Alabama.....	51,998	263
Mississippi.....	46,865	138
Louisiana.....	48,506	71
Arkansas.....	53,335	199
Missouri.....	69,420	273
Oklahoma.....	70,057	149
Kansas.....	82,158	380
Iowa.....	56,147	285

¹ Finley, J. P.: Tornado occurrences and distributions. The National Underwriter, Apr. 1, 1926.

The tornado is typically American, and finds its real home in the great central lowlands of eastern United States. About 4,700 tornadoes have been recorded in the United States, nearly all occurring east of the Rockies. Uniformly distributed over United States, this is an average of 15.6 per unit area of 10,000 square miles. Virginia has an average of 14.8 for the same unit area. Tornadoes have been recorded in Virginia in every month except January. (See Table 4.) Fifty-five and four-tenths per cent of the reported tornadoes were confined to July, August, and September. May is also a tornado month. The number in June shows a marked decrease over the month preceding and the months following, an abnormality difficult to explain. Tornadoes are rare in

autumn and early spring. March and April, tornado months in the Mississippi Valley, include only 8, or 12.7 per cent, of those recorded in Virginia. October, with its three tornadoes, 4.8 per cent, shows a marked decrease over September.

TABLE 4.—Total number and percentage of tornadoes recorded in Virginia by months, 1814–1925, inclusive

Month	Number	Per-centage	Month	Number	Per-centage
January.....	0	0	July.....	13	20.4
February.....	1	1.6	August.....	11	17.5
March.....	2	3.2	September.....	11	17.5
April.....	6	9.6	October.....	3	4.8
May.....	11	17.5	November.....	0	0
June.....	5	7.9	December.....	0	0
				63	100.0

The occurrences by hours (so far as known) of tornadoes in Virginia are contained in Table 5.

TABLE 5.—Hourly frequency of tornadoes in Virginia, 1814–1925, inclusive

A. m.			P. m.		
Hour	Total number	Per-centage	Hour	Total number	Per-centage
12 to 1.....	1	2.4	12 to 1.....	1	2.4
1 to 2.....	0	0	1 to 2.....	1	2.4
2 to 3.....	0	0	2 to 3.....	2	4.8
3 to 4.....	0	0	3 to 4.....	7	16.7
4 to 5.....	1	2.4	4 to 5.....	12	28.5
5 to 6.....	0	0	5 to 6.....	8	19.0
6 to 7.....	0	0	6 to 7.....	3	7.1
7 to 8.....	0	0	7 to 8.....	0	0
8 to 9.....	0	0	8 to 9.....	3	7.1
9 to 10.....	0	0	9 to 10.....	1	2.4
10 to 11.....	0	0	10 to 11.....	2	4.8
11 to 12.....	0	0	11 to 12.....	0	0
				42	100.0

Hour uncertain, a. m. 0
 Hour uncertain, p. m. 12
 Hour unknown..... 9

The hour of occurrence of 42, or two-thirds, of Virginia tornadoes is known. Of the remaining 21, or one-third, 12 are known to have occurred between noon and midnight. Only 2 are known to have occurred between midnight and noon. The maximum is attained between 4 and 5 in the afternoon, with a rapid decrease in number before and after that hour. Nine of the 42 are reported as having occurred after 6 p. m. and only 6 before 3 p. m. This indicates a sharp increase after 3 p. m. and a more gradual decrease after 6 p. m. The "danger hours" are clearly between 3 and 6 p. m.

Tornadoes have not been uniformly distributed over the State. There is a marked tendency toward grouping in the southern Piedmont and southern Coastal Plain. West of the Blue Ridge they have been very rare, and

they are sparsely spaced in the northern Piedmont and northern Coastal Plain. In the Coastal Plain province 21 have been recorded, in the Piedmont 31, west of the Blue Ridge, 7. Four crossed the fall belt from the Piedmont into the Coastal Plain. The localization of Virginia tornadoes essentially in the Piedmont and the Coastal Plain is brought out on the map (fig. 1). The reason for this concentration may be as follows: The tornadoes developed typically in the southern and southeastern parts of elongated lows with major axes, along which the wind-shift line is well developed, extending northeast-southwest. Hence the typical translation of the tornado northeastward (38 out of the 63 reported in Virginia moved thus) in these sectors of the low with the general northeastward progression of the low itself, and hence also the typical occurrence of the tornado near the wind-shift line. With the passage of the wind-shift line eastward the cooler westerly and northwesterly winds blow across the mountains over the warm air currents moving northeasterly at the surface of the Piedmont and Coastal Plain. The differences in direction of movement of the air currents and temperature contrast, together with local convection, are favorable both to thunderstorm and tornado development. These contrasts should become more marked southward due to increase in altitude of the Appalachians and to higher temperatures of the surface currents. This seems to explain the increase in tornado frequency southward in Virginia and in the Piedmont and Coastal Plain of southeastern United States.

Six tornadoes moved eastward, 8 southeast, 1 south or southwest, 1 northwest, and 3 northward. The directions of movement of 6 are unknown. Data are not at hand to explain departures from normal direction of translation. Eastward and southeastward movements are produced in some cases when the tornado develops in the southwest quadrant of the low, where the prevailing wind direction is from the northwest.

The length of paths pursued by 21 of the tornadoes is not known; of the remaining 42 the average length of path was 11 miles. Rarely were they more than 12 miles long, and 12, or 28 per cent, were 5 miles or less in length. The tornado of September 12, 1878 (No. 14), that passed through Fords Station in Dinwiddie County had a path 45 miles long, and that of August 3, 1915 (No. 48), traversing east Dinwiddie County, had a path 40 miles long. The length of the path of the Nottoway tornado (No. 10), was 35 miles, and of the Goochland tornado (No. 15), 28 miles in a southeast direction. The other tornadoes had paths of 20 miles or less in length.

The widths of 44 tornado tracks in Virginia averaged 930 feet, while the average width of American tornado paths (zone of severe destruction) is 1,200 feet. Only 5 of the 44 had paths as wide as 2,500 feet, only 11 had paths wider than 1,200 feet, and 13 had paths 500 feet wide or less.

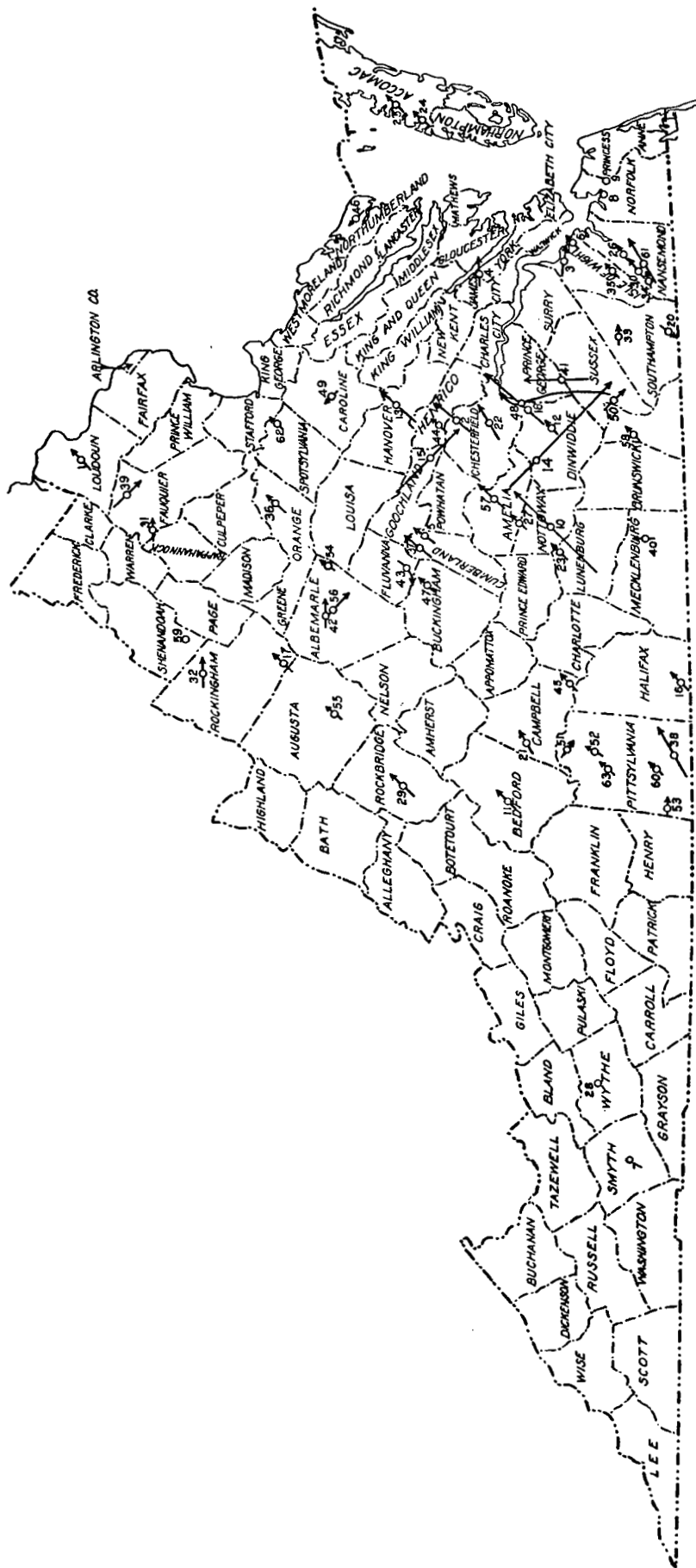


FIG. 1.—Tornadoes in Virginia. (Arrows show approximate direction of tornado travel, where known)

Of the 100 counties comprised in Virginia, 39 have been visited by tornadoes. Those most affected lie in southern and southeastern Virginia. The following table shows the distribution by counties:

TABLE 6.—*Distribution by counties of known tornadoes in Virginia, 1914-1925*

Accomac.....	2	King William.....	0
Albemarle.....	3	Lancaster.....	0
Alleghany.....	0	Lee.....	0
Amelia.....	4	Loudoun.....	1
Amherst.....	0	Louisa.....	0
Appomattox.....	0	Lunenburg.....	2
Arlington.....	0	Madison.....	0
Augusta.....	1	Mathews.....	0
Bath.....	0	Mecklenburg.....	1
Bedford.....	1	Middlesex.....	0
Bland.....	0	Montgomery.....	0
Botetourt.....	0	Nansemond.....	4
Brunswick.....	0	Nelson.....	0
Buchanan.....	0	New Kent.....	0
Buckingham.....	1	Norfolk.....	2
Campbell.....	2	Northampton.....	0
Caroline.....	1	Northumberland.....	1
Carroll.....	0	Nottoway.....	3
Charles City.....	0	Orange.....	1
Charlotte.....	0	Page.....	0
Chesterfield.....	3	Patrick.....	0
Clarke.....	0	Pittsylvania.....	6
Craig.....	0	Powhatan.....	1
Culpeper.....	0	Prince Edward.....	0
Cumberland.....	2	Prince George.....	3
Dickenson.....	0	Princess Anne.....	0
Dinwiddie.....	4	Prince William.....	0
Elizabeth City.....	0	Pulaski.....	0
Essex.....	0	Rappahannock.....	0
Fairfax.....	0	Richmond.....	0
Fauquier.....	2	Roanoke.....	0
Floyd.....	0	Rockbridge.....	1
Fluvanna.....	1	Rockingham.....	2
Franklin.....	0	Russell.....	0
Frederick.....	0	Scott.....	0
Giles.....	0	Shenandoah.....	1
Gloucester.....	0	Smyth.....	1
Goochland.....	2	Southampton.....	2
Grayson.....	0	Spotsylvania.....	1
Greene.....	0	Stafford.....	0
Greensville.....	2	Surry.....	0
Halifax.....	1	Sussex.....	4
Hanover.....	1	Tazewell.....	0
Henrico.....	2	Warren.....	0
Henry.....	0	Warwick.....	0
Highland.....	0	Washington.....	0
Isle of Wight.....	3	Westmoreland.....	0
James City.....	1	Wise.....	0
King and Queen.....	0	Wythe.....	1
King George.....	0	York.....	0

Pittsylvania County, in the southern part of the State, leads in tornadoes, having experienced 6, including the most destructive of all Virginia tornadoes, the Gretna tornado of October 29, 1917. Amelia, Dinwiddie, and Nansemond Counties have each been visited by 4. Albemarle, in the central part of the State, Chesterfield, Isle of Wight, and Sussex Counties, in southeastern Virginia, have had 3 each. The eastern shore has been visited by 2 tornadoes, both in Accomac County, and the same number has visited 10 other counties. Twenty counties have had but a single visitation. Counties thus far immune lie chiefly in northern Virginia and west of the Blue Ridge.

In 37 Virginia tornadoes a distinct tornado cloud (31 reported as funnel-shaped, 4 as cone-shaped, 2 as basket-shaped) was observed. In those tornadoes in which no such cloud was seen, tornadic violence was strongly

attested both by wind velocity and destructive effects. The presence of a tornado cloud is likely to be overlooked, especially after nightfall and during the heavy downpours of rain accompanying most Virginia tornadoes, for people are indoors and the rapid passage of the tornado cloud is not observed.

In rural sections the destructive effects of tornadoes are difficult to evaluate. The tornado sweeps through fields and woods, destroying outbuildings, crops, and timber. The outbuildings are quickly repaired by local labor, crops are replanted unless the season be too far advanced, and the fallen timber is converted into lumber, posts, and firewood, with little thought of estimating financially the total destruction. In only a few storms, the most destructive, has there been any attempt to appraise the financial loss. The Gretna tornado, Pittsylvania County, October 29, 1917, destroyed property, chiefly buildings and dwellings, valued at \$50,000. This was the most destructive Virginia tornado. The Mount Jackson storm of July 2, 1925, caused a loss estimated at \$150,000, but it is apparent from the newspaper reports that hail and squall winds were responsible for much of the damage, confined in large part to orchards.

The tornado that swept through Maplewood, Amelia County, on April 30, 1924, damaged buildings and crops to the extent of \$30,000. The Myrtle, Nansemond County, tornado of April 18, 1887 (No. 26), and the Jarratt, Sussex County, tornado of October 29, 1917 (No. 50), were \$10,000 storms, and the Whittles, Pittsylvania County, tornado of September 16, 1925, damaged buildings and crops to the extent of \$6,000. The Petersburg tornado of August 3, 1915, was responsible for damage in excess of \$10,000. The damage resulting from other Virginia tornadoes apparently amounted to \$5,000 or less for each occurrence. A conservative estimate of the total damage resulting from all tornadoes in Virginia is not less than \$300,000. Pittsylvania County has been the greatest sufferer, with Amelia, Nansemond, and Dinwiddie sustaining severe losses. Years of severest damage were 1878, 1886, 1887, 1888, 1915, 1917, 1924, and 1925.

The loss of life from tornadoes in Virginia has been gratifyingly small. Of the 63 tornadoes, 11 resulted in fatalities, claiming a total of 17 persons either killed outright or dying subsequently from injuries. The list of injured shows a total of 82 persons, although this number is probably an underestimate, for cases of minor injuries are not likely to be reported. Twenty-five of the tornadoes resulted in injuries. In the Manchester tornado of July 27, 1816 (No. 2), 2 were killed and 3 injured; 3 were killed and 4 injured in the Smithfield tornado of May 16, 1834 (No. 3), and 2 were killed and 5 injured in the Myrtle tornado of April 18, 1887 (No. 26). On July 8, 1888, 2 were killed and 4 injured in Fauquier County (No. 31), and on May 11, 1889 (No. 37), 2 were killed and 1 injured in Cumberland County. The Gretna tornado (No. 52) resulted in the loss of 1 life and injuries to 3, a remarkably small casualty list considering the intensity and destructiveness of the tornado. The Maplewood tornado of April 30, 1924, resulted in 1 death and injuries to 12. The average death toll has been 0.27 persons for each tornado, with 1.30 persons injured. The following table shows the number killed and injured per year.

TABLE 7.—*Number of persons killed or injured in Virginia by tornadoes, 1814-1925, inclusive*

Year	Killed	Injured	Year	Killed	Injured
1814	—	2	1889	2	1
1816	2	3	1896	—	5
1834	4	7	1904	—	1
1842	—	3	1912	—	2
1857	—	2	1917	1	3
1879	—	3	1921	—	2
1884	—	2	1924	1	12
1886	1	3	1925	—	5
1887	2	5			
1888	4	21	Total	17	82

Table 7 indicates that the danger from tornadoes in Virginia is not great. Moreover, it has been computed

that in the tornado States in the Mississippi Valley the probability that a farm the size of 1 square mile will be struck by a tornado is less than one-sixteenth of 1 per cent per century. The area of Virginia is 42,617 square miles. The tornado frequency per year since 1870 is 1.02; therefore the chance that a tornado in any year may cross a particular locality 1 mile square is 42,627/1.02. This is one chance in 41,000, and hence is scarcely worth considering. The probability of tornado destruction of life or property is far less than that from lightning and fire. And so far as life is concerned, the tornado is not to be remotely compared with the ubiquitous and space-defying automobile.

THE ILLINOIS TORNADO OF APRIL 19, 1927

By CLARENCE J. ROOT,

[Weather Bureau, Springfield, Ill.]

Illinois has had another long-path tornado, the fifth of more than 100 miles within the State to occur during the last 10 years. In its course it caused 21 deaths, the known injury of 183 persons, and estimated property losses of \$1,369,500.

At 7 a. m. of the 19th a trough of low pressure lay west of Illinois. The isobar of 29.60 inches inclosed an elongated area extending from western Lake Superior to eastern Kansas. The center (29.50 inches) was at St. Paul. Southerly winds and mild temperatures were general in the Mississippi Valley as far north as Minnesota. This was in direct contrast with the condition that obtained at the time of the tri-State tornado of March 18, 1925. At that time northerly winds and low temperature north of the tornado track met the warm southerly winds that prevailed to the southward. By 7 p. m. of the 19th the center of the low-pressure area was north of Lake Superior, thunderstorms had occurred over northern and central Illinois, and the winds were west at Springfield and northwest in all of western Illinois. At Springfield the wind veered from south-southeast preceding the storm to southwest immediately after, and later to west and northwest. It is very evident that the tornado occurred on the shift line.

At the time the tornado passed Springfield it became quite dark, and excessive rain and some hail fell. The clouds moved from the south and were angry and turbulent in appearance. In the southeast some white scuds appeared. During the forenoon poorly defined mammato-cumulus clouds were observed. On April 4, 12, and the morning of the 19th the barograph showed changes typical of tornadic conditions, but nothing happened. About the time of the tornado the barometer fluctuated considerably. From noon until a little after 1:00 p. m. it fell rapidly, but not suddenly, 0.11 inch, then rose suddenly 0.10 inch, after which it fell and rose a little before 2:00 p. m.

According to the section director for Missouri the tornado had its inception 4 miles southwest of Apex, Lincoln County. It moved 7 miles in Missouri, injuring 12 persons and doing considerable damage; then crossed the Mississippi River into Illinois. It passed in a northeast direction over a nearly straight course through the counties of Calhoun, Greene, Macoupin, Morgan, Sangamon, Logan, De Witt, apparently terminating near the Ford-Livingston boundary line, a total distance of about 170 miles.

Two lives were lost in Calhoun County, the narrow peninsula between the Illinois and Mississippi Rivers. The storm passed one-half mile northwest of Hardin and crossed Greene County with no skipping, passing one-

half mile north of Carrollton, the county seat, and damaging farm properties across the county. Three persons were killed southwest of Carrollton, including that brave young teacher, Miss Annie Keller, who sacrificed her life in the effort to save the lives of the 18 pupils in the school building, none of whom was seriously injured. The pupils were directed to take shelter under the seats. Four persons were killed near Wrights, and one near Athensville. The path of the storm then led across the northwest corner of Macoupin County and the southeast corner of Morgan County, passing one-half mile northwest of Waverly, and entered Sangamon County southwest of Loami. It passed only one-fourth mile southeast of that town. A death occurred 2 miles east of Loami. In Sangamon County west of the Springfield-St. Louis highway (route 4) the property loss was \$65,000. Three buildings at the highway were damaged about \$6,000.

Representatives of the Springfield Weather Bureau office visited Buffalo Hart, Cornland, Riverton, and the zone south of Springfield. The next damage was in a built-up section at the extreme southeast of Springfield, immediately outside the city limits. The path here was not over 300 feet wide. One house was moved 7 feet, and seven others had minor damage. Soon after leaving Springfield the tornado seemed to lift and after passing over a portion of Riverton struck the northeast part of that place, demolishing seven dwellings, mostly miners' cottages, damaging about a dozen more, six of them badly, with loss estimated at \$10,000; then striking the Peabody Coal Mine it caused damage to the extent of about \$40,000. Buffalo Hart was the first town to lie directly in the path of the storm. This hamlet is in the woods known as "Timberland." The tree destruction was severe. The elevator was turned over, the depot and store partially wrecked, but the church escaped. Five residences were destroyed, five badly damaged, and only one escaped serious harm. There were three deaths here and nine were injured. The money loss was about \$35,000. For the next 30 miles the path followed directly or closely the Illinois Central Railroad.

Cornland, 3 miles from Buffalo Hart, was the only center of population of importance that felt the full fury of the storm. The path of severe damage, about 1,000 feet, covered all but the south edge of the town. The total width of the path here was about 2,000 feet. Of the 48 residences, 5 were very little harmed, 7 were a total loss, and the other 36 received varying degrees of damage. The 2 churches and 5 stores were destroyed, the bank partly wrecked, but the 2 elevators, depot, and 2 school buildings received very little injury. The total